WHAT IS CLAIMED IS:

1. A method for electrochemically depositing a polysaccharide having a selected physical state, comprising:

providing a substrate comprising a substrate surface, the substrate surface comprising an electrically conductive support;

contacting the electrically conductive support with an aqueous solution comprising a selectively insolubilizable polysaccharide; and

electrochemically depositing the selectively insolubilizable polysaccharide on the electrically conductive support while controlling deposition conditions to form a polysaccharide mass having a selected physical state.

2. A method according to claim 1, wherein the selected physical state comprises that of a hydrogel.

3. A method according to claim 2, wherein said electrochemically depositing is conducted at a current density of about 20 A/m^2 to about 100 A/m^2.

4. A method according to claim 2 or 3, wherein said electrochemically depositing is conducted at a pH of about 5 to about 5.5.

5. A method according to any one of claims 2 to 4, wherein said electrochemically depositing is conducted for a deposition time of about 2 minutes to about 30 minutes.

6. A method according to any one of claims 1 to 5, wherein said controlling of deposition conditions comprises varying the deposition

conditions during said electrochemical deposition to provide the polysaccharide mass with a hydrogel portion and a solid compact film portion.

7. A method according to claim 6, wherein the hydrogel portion is layered on top of the solid compact film portion.

8. A method according to any one of claims 1 to 7, wherein the selectively insolubilizable polysaccharide comprises an ionizable group that is ionized to provide a positive charge.

9. A method according to claim 8, wherein the ionizable group comprises a member selected from an alkyl amine group, a primary amine group, a secondary amine group, a tertiary amine group, a guanidinium group, an imidazole group, an indole group, a purine group, a pyrimidine group, and a pyrrole group.

10. A method according to claim 8, wherein the ionizable group comprises a primary amine group.

11. A method according to claim 10, wherein the selectively insolubilizable polysaccharide comprises chitosan.

12. A method according to any one of claims 1 to 11, further comprising treating the polysaccharide mass with a sufficiently basic solution to stabilize the polysaccharide mass.

13. A method according to any one of claims 1 to 7, wherein the selectively insolubilizable polysaccharide comprises an ionizable group that is ionized to provide a negative charge.

14. A method according to claim 13, wherein the ionizable group comprises a member selected from an alkoxide group, carboxyl group, hydroxy acid group, phenolic group, phosphate group, and sulfhydryl group.

15. A method according to claim 14, wherein the ionizable group comprises a carboxyl group.

16. A method according to any one of claims 1 to 7 and 13 to 15, further comprising treating the polysaccharide mass with a sufficiently acidic solution to stabilize the polysaccharide mass.

17. A method according to any one of claims 1 to 16, wherein the substrate comprises a non-conducting, inorganic material.

18. A method according to claim 17, wherein the substrate comprises silicon.

19. A method according to any one of claims 1 to 18, wherein the electrically conductive support comprises gold.

20. A method according to any one of claims 1 to 19, wherein:

the electrically conductive support is patterned and the substrate surface further comprises an electrically non-conductive portion; and

said depositing comprises selectively depositing the selectively insolubilizable polysaccharide on the patterned electrically conductive support.

21. A method according to claim 20, wherein the patterned electrically conductive support comprises a plurality of parallel lines spaced apart from one another.

22. A method according to any one of claims 1 to 21, wherein the polysaccharide mass comprises a hydrogel, and wherein the method further comprises entrapping in the hydrogel at least one member selected from the group consisting of colloids, micelles, vesicles and cells.

23. A method according to claim 1, wherein the selectively insolubilizable polysaccharide comprises chitosan, and wherein the polysaccharide mass comprises a hydrogel,

24. A method for conjugating molecules to a polysaccharide mass, comprising:

providing a polysaccharide mass having a selected physical state and derived from a selectively insolubilizable polysaccharide deposited on an electrically conductive support; and

coupling other molecules to the polysaccharide mass.

25. A method according to claim 24, further comprising:

providing a substrate comprising a substrate surface, the substrate surface comprising an electrically conductive support;

contacting the electrically conductive support with an aqueous solution comprising a selectively insolubilizable polysaccharide; and

electrochemically depositing the selectively insolubilizable polysaccharide on the electrically conductive support while controlling

deposition conditions to form the polysaccharide mass having a selected physical state.

26. A method according to claim 25, wherein the selectively insolubilizable polysaccharide comprises chitosan, and wherein the polysaccharide mass comprises a hydrogel,

27. A method according to claim 25 or 26, wherein said electrochemically depositing is conducted at a current density of about 20 A/m^2 to about 100 A/m^2.

28. A method according to any one of claims 25 to 27, wherein the polysaccharide mass comprises a hydrogel, and wherein the method further comprises entrapping in the hydrogel at least one member selected from the group consisting of colloids, micelles, vesicles and cells.

29. A method according to any one of claims 25 to 28, wherein said coupling of the other molecules to the selectively insolubilizable polysaccharide is performed prior to said electrochemically depositing step.

30. A method according to any one of claims 25 to 28, further said coupling of the other molecules to the polysaccharide mass is performed after said electrochemically depositing step.

31. A method according to any one of claims 25 to 30, further comprising modifying the selectively insolubilizable polysaccharide to improve conjugatability with reactive groups of other molecules.

32. A method according to any one of claims 24 to 32, wherein said coupling comprises covalent bonding.

33. A method according to any one of claims 24 to 32, wherein said other molecules comprise one, two, three or more enzyme species.

34. A method according to any one of claims 24 to 32, wherein said other molecules comprise one, two, three or more antibody species.

35. A method according to any one of claims 24 to 32, wherein said other molecules comprise one, two, three or more receptor molecule species.

36. A method according to any one of claims 24 to 32, wherein said other molecules comprise one, two, three or more nucleic acid molecule species.

37. A method according to any one of claims 24 to 32, wherein said other molecules are modified to include tyrosine residues.

38. A method according to claim 37, wherein said coupling of the other molecules to the selectively insolubilizable polysaccharide comprises a tyrosinase-catalyzed oxidation reaction.

39. A material comprising a selectively insolubilizable polysaccharide hydrogel deposited on an electrically conductive support.

40. A material comprising a selectively insolubilizable polysaccharide hydrogel deposited in a spatially selective manner.

41. A device comprising a material of claim 39 or 40.

42. A device according to claim 41, wherein the device comprises a microelectromechanical system.

43. A device according to claim 41 or 42, wherein the device comprises microchannels fabricated in a substrate such that electrodes are located within the microchannels to enable selective electrodeposition using fluidic flow in the microchannels.